

PATENT ABSTRACTS OF JAPAN

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(54) POLYTETRAFLUOROETHYLENE AQUEOUS DISPERSION COMPOSITION AND METHOD FOR PRODUCING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a method capable of effectively reducing the concentration of a perfluorocarboxylic acid salt-based anion surfactant (hereinafter referred to as APFC) contained in an aqueous dispersion of a polytetrafluoroethylene (hereinafter referred to as PTFE), and to provide a PTFE aqueous dispersion composition obtained by the method. SOLUTION: The method for producing the PTFE aqueous dispersion composition comprises adding an anionic surfactant other than APFC in an amount of 0.1-20 mass% based on mass of PTFE and water in an amount of 10-800 mass% based on mass of PTFE to the PTFE aqueous dispersion obtained by carrying out emulsion polymerization of tetrafluoroethylene in the presence of APFC and precipitating PTFE at pH 5-11 and fractionating a highly concentrated dispersion composition containing PTFE in a high concentration from a supernatant liquid.

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CLAIMS

[Claim(s)]

[Claim 1]

To the polytetrafluoroethylene aquosity dispersion liquid obtained by carrying out the emulsion polymerization of the tetrafluoroethylene under existence of a perfluoro carboxylate system anionic surface active agent The mass of polytetrafluoroethylene is received in anionic surface active agents other than a perfluoro carboxylate system anionic surface active agent. 0.1 to 20 mass %, 10-800 mass % addition of water is done to the mass of polytetrafluoroethylene. The manufacture approach of a polytetrafluoroethylene aquosity dispersion-liquid constituent that pH is characterized by making polytetrafluoroethylene sediment by 5-11, and classifying a polytetrafluoroethylene high concentration aquosity dispersion-liquid constituent from a supernatant.

[Claim 2]

The manufacture approach of the polytetrafluoroethylene aquosity dispersion-liquid constituent characterized by doing 100-800 mass % addition of water to the mass of polytetrafluoroethylene, making polytetrafluoroethylene sediment further to the polytetrafluoroethylene high concentration aquosity dispersion-liquid constituent obtained by the approach according to claim 1, and classifying a polytetrafluoroethylene high concentration aquosity dispersion-liquid constituent from a supernatant to it.

[Claim 3]

The polytetrafluoroethylene aquosity dispersion-liquid constituent which was obtained by the approach according to claim 1 or 2 and which does 30-70 mass % content of polytetrafluoroethylene, and contains 250 ppm or less of perfluoro carboxylate system anionic surface active agents to polytetrafluoroethylene.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the PTFE aqueous dispersion-liquid constituent obtained by the manufacture approach of a polytetrafluoroethylene (henceforth PTFE) aqueous dispersion-liquid constituent, and its manufacture approach.

[0002]

[Description of the Prior Art]

PTFE by the emulsion-polymerization method is obtained by carrying out the polymerization of the tetrafluoroethylene (henceforth TFE) monomer under existence of water, a polymerization initiator, a perfluoro carboxylate system anionic surface active agent (henceforth APFC), a paraffin wax stabilizer, etc., and is obtained as PTFE aqueous dispersion liquid containing a PTFE particle. In addition, it is known that APFC in PTFE aqueous dispersion liquid is adsorbed by the PTFE particle in most.

Although it was used, having used the PTFE aqueous dispersion liquid after a polymerization as it was, or having been condensed or was used as a PTFE aqueous dispersion-liquid constituent which, in addition to this, blended a surfactant, a filler, or other well-known components if needed, removing specially APFC in a PTFE aqueous dispersion-liquid constituent was not performed industrially.

[0003]

This APFC is very expensive and, as for APFC used at the time of the polymerization of PTFE, it is desirable to collect as much as possible and to reuse.

In order to gather the recovery of APFC, the APFC concentration contained in the PTFE aqueous dispersion-liquid constituent used as a product is lowered, and it is required to make APFC shift out of a product as much as possible.

In order to make APFC shift out of a PTFE aqueous dispersion-liquid constituent, the method of making ion exchange resin adsorb through and APFC to PTFE aqueous dispersion liquid is proposed — **** (patent reference 1 reference) — since ion exchange resin blockades by the PTFE particle, there is a problem to which the adsorption engine performance falls, moreover, in order to make APFC shift out of a PTFE aqueous dispersion-liquid constituent, the method of boiling a PTFE aqueous dispersion-liquid constituent and volatilizing APFC is proposed — **** (patent reference 1 reference) — there is a problem to which an aggregate is generated by the processing process and the yield tends to fall.

[0004]

[Patent reference 1]

International public presentation WO 00/No. 35971 pamphlet

[Patent reference 2]

International public presentation WO 01/No. 79332 pamphlet

[0005]

[Problem(s) to be Solved by the Invention]

This invention aims at offering the PTFE aqueous dispersion-liquid constituent obtained by the

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hydrocarbon group fluorinated completely substantially, and may have 1-2 hydrogen atoms which are not fluorinated. The thing of 3-12 has the point of polymerization stability to a desirable carbon number, as for a perfluoro hydrocarbon group, 4-10 are more desirable, and it is desirable that a carbon number is 7 especially. Moreover, although alkali metal, such as four NH(s), an alkanolamine radical, and Li, Na, K, etc. is mentioned, as for the basic group of Y, it is desirable that they are four NH(s).

[0012]

The content of APFC has desirable 200-10,000 ppm to the tap of PTFE, and especially its 800-5,000 ppm are desirable.

The mean particle diameter of the PTFE particle in PTFE aqueous dispersion liquid has desirable 0.15-0.50 micrometers, its 0.18-0.45 micrometers are more desirable, and especially its 0.2-0.35 micrometers are desirable. When mean particle diameter is too small, the sedimentation nature in a concentration process is bad, and since the preservation stability of a product will fall if mean particle diameter is too large, it is not desirable.

As a stabilizer used at the time of a PTFE polymerization, fluorine system oil besides paraffin wax, a fluorine system solvent, silicone oil, etc. are desirable. These are independent or one sort may be used for them combining two or more sorts. It is desirable to perform the polymerization of TFE to the bottom of existence of paraffin wax especially. As paraffin wax, although a liquid or a semisolid may also be a solid-state at a room temperature, with a carbon numbers of 12 or more saturated hydrocarbon is desirable. The melting point of paraffin wax usually has desirable 40-65 degrees C, and its 50-65 degrees C are more desirable. The amount of paraffin wax has desirable 0.1 - 12 mass % on the mass criteria of the water used, and its 0.1 - 8 mass % is more desirable. In addition, since stabilizers, such as a wax, are separated as an upper phase by putting PTFE aqueous dispersion liquid at the time of polymerization reaction termination, it is more easily [than PTFE aqueous dispersion liquid] removable.

[0013]

The thing of 1-3 has [the configuration of the PTFE particle in PTFE aqueous dispersion liquid] the desirable average of the aspect ratio which ** (ed) the major axis of a particle by the minor axis, and, as for this, the shape of a ball and a fusiform form correspond. When an aspect ratio is the so-called, too large needlelike particle, since [that the sedimentation nature in a concentration process is bad and] specific surface area is large, APFC is easy to remain on a PTFE particle front face and is not desirable.

The PTFE concentration in PTFE aqueous dispersion liquid has desirable 10 - 50 mass %, its 15 - 40 mass % is more desirable, and especially its 20 - 35 mass % is desirable. When a polymerization process is finished in the condition that PTFE concentration is low, since it is easy to contain a needlelike particle or PTFE particle diameter is too small, it is not desirable.

[0014]

Anionic surface active agents other than APFC used by this invention,

[Formula 2]

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method of reducing efficiently the APFC concentration contained in PTFE aqueous dispersion liquid, and its approach.

[0006]

[Means for Solving the Problem]

In order that this invention person may conquer the above-mentioned technical problem, as a result of repeating research wholeheartedly, to PTFE aqueous dispersion liquid it discovers that APFC which is sticking to a PTFE particle front face by carrying out the amount addition of specification of the anionic surface active agents and water other than APFC, and making pH or more into five shifts to the aqueous phase efficiently. It came to complete a header and this invention for the ability of the APFC concentration in a PTFE aqueous dispersion-liquid constituent to be reduced sharply by making a PTFE particle sediment, making PTFE into high concentration in a sedimentation part, and removing most aqueous phase according to the concentration process which removes a supernatant. It became possible to collect a lot of APFC (s) from the aqueous phase obtained by this.

[0007]

That is, do 10-800 mass % addition of 0.1 to 20 mass %, and water for anionic surface active agents other than APFC to the mass of PTFE to the mass of PTFE, pH makes PTFE sediment by 5-11, and this invention provides the PTFE aqueous dispersion liquid obtained by carrying out the emulsion polymerization of the TFE under existence of APFC with the manufacture approach of the PTFE aqueous dispersion-liquid constituent characterized by classifying a PTFE high concentration aqueous dispersion-liquid constituent from a supernatant.

[0008]

Moreover, this invention does 100-800 mass % addition of water to the mass of PTFE, makes PTFE sediment further to the PTFE high concentration aqueous dispersion-liquid constituent obtained by the manufacture approach of the above-mentioned PTFE aqueous dispersion-liquid constituent, and offers the manufacture approach of the PTFE aqueous dispersion-liquid constituent characterized by classifying a PTFE high concentration aqueous dispersion-liquid constituent from a supernatant.

Moreover, this invention offers the PTFE aqueous dispersion-liquid constituent which was obtained by the above-mentioned manufacture approach and which does 30-70 mass % content of PTFE, and contains 250 ppm or less of APFC(s) to PTFE.

[0009]

[Embodiment of the Invention]

The PTFE aqueous dispersion liquid used as a start raw material by this invention are PTFE aqueous dispersion liquid to carry out 10-50 mass % content preferably about PTFE obtained by carrying out the emulsion polymerization of the TFE under existence of APFC.

As for PTFE aqueous dispersion liquid, what is obtained by carrying out a polymerization by pouring in TFE under the pressurization of two to 50 atmospheric pressure under existence of stabilizers, such as pure water, a peroxide or a redox system polymerization initiator, APFC, and paraffin wax, etc. is desirable.

[0010]

Here, with PTFE, the so-called denaturation PTFE including one or more sorts of polymerization units based on TFE(s), such as fluoro vinyl ether, such as halogenation propylenes, such as halogenation ethylene, such as chlorotrifluoroethylene of the homopolymerization object of TFE or the minute amount of extent which cannot perform melting processing substantially, and hexafluoropropylene, and perfluoroalkyl vinyl ether, and the copolymerization component which may be copolymerized is included. The average molecular weight of PTFE has the desirable thing of the range of 100,000-100,000,000.

As for APFC, what is expressed with a general formula (1) is desirable.

[0011]

[Formula 1]

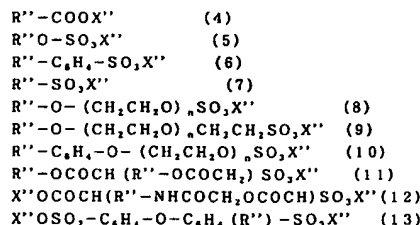
X-COOY (1)

(X is the poly fluoro hydrocarbon group among a formula, and Y is a basic group.)

The poly fluoro hydrocarbon group of X in a general formula (1) may have the desirable perfluoro

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Although expressed with which general formula, it can choose from inside, and it is a general formula (4), (5), (7), (8), (9), and (11) preferably, and is a general formula (4) and (5) especially preferably.

[0015]

General formula (4) in - (13), a carbon number is the saturation or the partial saturation alkyl group of 5-22, the carbon number is 8-20 preferably, and R'' is 7-18 especially preferably. Moreover, although four NH(s), an alkanolamine radical, alkali metal, etc. are mentioned, as for X'' in general formula (4) - (13), it is desirable that they are four NH(s). In addition, as an alkali metal, although Li, Na, K, etc. are mentioned, Na is desirable.

General formula (8) in - (10), n is the integer of 0-10 and its integer of 0-5 is desirable.

[0016]

As a suitable example of anionic surface active agents other than APFC C11H23-CO2Na, C11H23-CO2NH4, C12H25-SO3Na, C12H25-SO3NH4 and C17H35-CO2Na, C17H35-CO2NH4, C18H37-SO3Na, C18H37 O-SO3NH4, C8H17-C8H4-SO3Na, Anionic surface active agents, such as C8H17-C8H4-SO3NH4, C8H17-C8H4-O-(CH2CH2O)3SO3Na, and C8H17-OCOCH (C8H17-OCOCH2) SO3Na, are mentioned.

[0017]

The addition of anion system surfactants other than APFC to the PTFE aqueous dispersion liquid in this invention is 0.1 to 20 mass % to the mass of PTFE, is 0.1 to 10 mass % preferably, is 0.2 to 8 mass % still more preferably, and is 0.5 to 5 mass % especially preferably. When there are few additions of anion system surfactants other than APFC, there is little desorption of APFC from a PTFE particle, and the stability of a PTFE aqueous dispersion-liquid constituent is spoiled. When there are too many additions of anion system surfactants other than APFC, the effectiveness of balancing an addition is not acquired but it is uneconomical.

[0018]

As for the water added by PTFE aqueous dispersion liquid, in this invention, it is desirable to use distilled water or ion exchange water because of viscosity stabilization. Since APFC of the addition of water from which more ones are separated after concentration increases, it is desirable, but since concentration of a PTFE particle will take time amount and productivity will fall if many [too], 10 - 800 mass % is desirable to the mass of PTFE, 20 - 600 mass % is more desirable, and further 30 - 500 mass % are desirable.

[0019]

In this invention, 5-11 are 5.5-9 desirable still more preferably, and pH of the PTFE aqueous dispersion liquid at the time of concentration is 5-8 especially preferably. Although pH of the PTFE aqueous dispersion liquid after a polymerization is usually 2-4, since less than five are insufficient as for dissociation of APFC, pH adjusts [APFC] easily and is not desirable [pH] to

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the liquid phase. Moreover, since operation becomes unstable and also pH produces an odor and the problem on safety by 11 ** at the time of the handling of a product at the time of concentration, it is not desirable. In order to set pH to 5-11, alkalis, such as ammonia, a sodium hydroxide, a potassium hydroxide, and ethanolamine, can be added, but it is desirable, especially in order that ammonia may vaporize in the desiccation phase at the time of processing of a PTFE aqueous dispersion-liquid constituent and may not remain for a product.

[0020]

In this invention, as for the PTFE aqueous dispersion liquid before concentration which added water, the anion system surfactant, and the alkali, it is desirable that PTFE concentration is one to 40 mass %, its 3 - 30 mass % is more desirable, its 4 - 24 mass % is still more desirable, and especially its 5 - 19 mass % is desirable.

In this invention, concentration of PTFE makes the PTFE particle in PTFE aqueous dispersion liquid sediment, and is performed by making the sedimentation part into high-concentration PTFE aqueous dispersion liquid. As the sedimentation approach, various approaches, such as the ED method (called the Electro-decantation method or the electric condensing method) or a centrifuge, can be used so that it may be indicated by the fluororesin handbook (32 or p 1990 daily-publication box-office newspaper publishing company issue, Takami Satokawa edit).

[0021]

Since a lot of APFC(s) contain the PTFE aqueous dispersion liquid which added an anion system surfactant and water in the supernatant which carries out up generation after they make a PTFE particle sediment according to a concentration process, they can classify a PTFE high concentration aqueous dispersion-liquid constituent with few APFC contents by separating this supernatant.

[0022]

It is desirable that PTFE concentration is 30 to 70 mass %, as for the PTFE high concentration aqueous dispersion-liquid constituent obtained, it is more desirable that it is 50 to 70 mass %, and it is desirable that it is especially 55 to 70 mass %. Although the direction which is high concentration can remove more APFC(s) from a PTFE high concentration aqueous dispersion-liquid constituent, since high concentration past ** and a PTFE particle are in process and it is easy to condense them, it is not desirable.

[0023]

Moreover, in this invention, after adding the water of 100 - 800 mass % to the mass of PTFE to the PTFE high concentration aqueous dispersion-liquid constituent obtained by the above-mentioned approach further, it is possible by passing through a re-enrichment of uranium isotope process to reduce further the APFC concentration in the obtained PTFE high concentration aqueous dispersion-liquid constituent. A re-enrichment of uranium isotope process can perform the above-mentioned concentration process and the same process. Moreover, the addition of water has more desirable 200 - 600 mass % to the mass of PTFE, and further 300 - its 500 mass % are desirable. Since APFC of the addition of water from which more ones are separated after a re-enrichment of uranium isotope increases, it is desirable, but if many [too], concentration of a PTFE particle will take time amount and productivity will fall. Furthermore, multiple-times operation of this re-enrichment of uranium isotope process may be carried out.

[0024]

In addition, can dilute and use it with that the PTFE high concentration aqueous dispersion-liquid constituent manufactured by this invention remains as it is, or water, and also Another anionic surface active agent, the Nonion system surface active agent, the viscous regulator of a polyethylene oxide system or a polyurethane system, Various leveling agents, ammonia, a sodium hydroxide, a potassium hydroxide, It can add if needed and organic acids, such as citric acid and an amber acid, antiseptics, a coloring agent, a filler, an organic solvent, and other other well-known components can be used as a PTFE aqueous dispersion-liquid constituent suitable for actual use.

In addition, in this invention, a PTFE aqueous dispersion-liquid constituent means a thing including a PTFE high concentration aqueous dispersion-liquid constituent.

[0025]

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concentration aqueous dispersion-liquid constituent was obtained.

The APFC concentration in these PTFE high concentration aqueous dispersion-liquid constituents was reduced sharply. In addition, in Example 3, since pH of the PTFE aqueous dispersion liquid at the time of concentration was a little as high as 9.1, operation at the time of electric concentration was instability for a while.

[0031]

[Example 5]

To the PTFE high concentration aqueous dispersion-liquid constituent obtained in Example 2, 400 mass % addition of water was done to PTFE, it condensed again, the supernatant was removed, and the PTFE aqueous dispersion-liquid constituent with which APFC concentration was reduced by 34 ppm to PTFE mass was obtained.

[Example 6]

APFC concentration is [520 ppm] to the mass of PTFE and was not desirable, although ammonia was not added and also being condensed on the same conditions as Example 1.

[0032]

[Example 7]

Although the PTFE aqueous dispersion-liquid constituent was obtained using the same process as Example 1 except not adding water before a concentration process, APFC concentration was 380 ppm to the mass of PTFE, and was not desirable.

[Example 8]

PTFE aqueous dispersion liquid were made to do the 200 mass % dissolution of the Nonion system surfactant (average molecular structure C12H25O(C2H4O)9H) to PTFE to PTFE, and 2 mass % and water were condensed like Example 1.

The APFC concentration in the obtained PTFE aqueous dispersion-liquid constituent was 680 ppm to the mass of PTFE, and was not desirable.

[0033]

[Table 1]

項目	例1	例2	例3	例4
PTFE水性PTFE濃度(質量%)	26	26	26	26
分散液 APFC濃度(ppm/PTFE)	2200	2200	2200	2200
PTFE水性界面活性剤	(a)	(b)	(c)	(d)
分散液への濃(質量%/PTFE)	2.0	4.2	3.0	2.8
加剤および濃水(質量%/PTFE)	200	400	225	500
濃アンモニア(ppm/PTFE)	250	190	200	250
濃pH	6.8	7.1	9.1	6.3
濃縮後のPTFE水性分散液のPTFE濃度(質量%)	17.0	12.7	16.3	11.3
濃縮プロセス	ED法	ED法	ED法	ED法
PTFE高濃PTFE濃度(質量%)	66.5	65.2	68.3	67.1
高濃水性分散液安定剤濃度(質量%/PTFE)	1.8	2.8	1.9	2.7
組成物 APFC濃度(ppm/PTFE)	214	135	172	155

[0034]

[Table 2]

It is desirable that PTFE concentration is 30 to 70 mass %, as for the PTFE concentration of a PTFE aqueous dispersion-liquid constituent, it is more desirable that it is 40 to 65 mass %, and it is desirable that it is especially 50 to 65 mass %. If a PTFE particle will tend to sediment at the time of preservation if PTFE concentration is too low, and PTFE concentration is too high, the loss in a concentration process increases and it is not desirable.

[0026]

Moreover, PTFE in a PTFE aqueous dispersion-liquid constituent and additive concentration other than water have desirable 2 - 20 mass % to the mass of PTFE, and its 2.5 - 12 mass % is more desirable.

It is desirable that it is 250 ppm or less to PTFE mass, as for the concentration of APFC in the obtained PTFE aqueous dispersion-liquid constituent, it is more desirable that it is 160 ppm or less, and it is desirable that it is especially 100 ppm or less.

In addition, a lot of APFC(s) contain in the supernatant isolated preparatively by this invention, and it can collect in well-known processes, such as distillation and an adsorption process.

[0027]

[Example]

Hereafter, although an example and the example of a comparison explain this invention in more detail, these do not limit this invention at all.

In addition, examples are Examples 1-5 and the examples of a comparison are Examples 6-8.

The evaluation approach of each item is shown below.

[0028]

(A) Average molecular weight of PTFE : according to the approach of Suwa (J. Appl. Polym. Sci. 17, 3253 (1973) publications), it asked from the latent heat in differential thermal analysis.

(B) Mean particle diameter of a PTFE particle : a photograph was taken by 10000 times after drying PTFE aqueous dispersion liquid using the scanning electron microscope, and the average was calculated.

(C) PTFE concentration and additive concentration : aqueous dispersion-liquid sample about 10g was put into the aluminum pan of mass known, the mass 1 hour after 120 degree C was calculated, and the solid content concentration S0 (%) was computed. Moreover, the liquid density in 25 degrees C was measured using *****, and it asked for the PTFE concentration S1 (%) using the conversion chart of Table 4. The additive concentration S2 (%/PTFE) was computed from $S2=100 \times (S0-S1) / S1$. In addition, it can be considered that additive concentration is additive concentration, such as a surfactant, APFC, etc. to PTFE mass.

[0029]

(D) APFC concentration : ethanol extracted a PTFE aqueous dispersion-liquid constituent or 50g of PTFE high concentration dispersion-liquid constituents after 16-hour desiccation at 70 degrees C, the gas chromatography analyzed, and the quantum was carried out using the calibration curve created beforehand. In addition, the criterion of the APFC concentration in a PTFE aqueous dispersion-liquid constituent made 200 ppm or less poor [fitness and 200 ppm super-***] to PTFE.

(E) pH : it was based on the glass electrode method.

In addition, surfactant (a) - (e) used in each example is equivalent to the surfactant of the sign corresponding to each of Table 1 and Table 2. The chemical structure and the name of article of the used surfactant are shown in Table 3.

[0030]

[Examples 1-4]

Use perfluoro octanoic-acid ammonium as APFC, and 2200 ppm is added before a polymerization to the lap of PTFE. 1 mass % is added for the paraffin wax as a stabilizer before a polymerization to the amount of water. Furthermore, by the emulsion-polymerization method The aspect ratio of a PTFE particle is 1.3, the average molecular weight of a PTFE particle was about 3 million, the mean particle diameter of a PTFE particle is 0.25 micrometers, and the PTFE aqueous dispersion liquid whose PTFE concentration is 26 mass % were obtained [it is pH=3.0 and]. The anion system surfactant of (a) - (d) shown in Table 1, water, and ammonia were added to these PTFE aqueous dispersion liquid, it condensed by the ED method, and the PTFE high

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項目	例6	例7	例8
PTFE水性PTFE濃度(質量%)	26	26	26
分散液 APFC濃度(ppm/PTFE)	2200	2200	2200
PTFE水性界面活性剤	(a)	(a)	(e)
分散液への濃(質量%/PTFE)	2.0	2.0	2.0
加剤および濃水(質量%/PTFE)	18	なし	200
濃アンモニア(ppm/PTFE)	なし	300	なし
濃pH	3.3	7.5	3.3
濃縮後のPTFE水性分散液のPTFE濃度(質量%)	24.7	25.9	17.0
濃縮プロセス	ED法	ED法	ED法
PTFE高濃PTFE濃度(質量%)	65.4	65.2	68.3
高濃水性分散液安定剤濃度(質量%/PTFE)	2.5	2.8	1.3
組成物 APFC濃度(ppm/PTFE)	520	380	680

[0035]

[Table 3]

番号	界面活性剤の平均分子式	備考
(a)	$C_{12}H_{25}OSO_3Na$	和光純薬製ラウリル硫酸ナトリウム
(b)	$C_{12}H_{25}OSO_3NH_4$	純化王製エマルAD25P (純分25質量%)
(c)	$C_{12}H_{25}COONH_4$	ラウリン酸をアンモニアで中和後に使用
(d)	$C_{12}H_{25}COONa$	和光純薬製ステアリン酸ナトリウム
(e)	$C_{12}H_{25}O(C_2H_4O)_9H$	ライオン製ポリオールSC90

[0036]

[Table 4]

PTFE濃度	濃比値	PTFE濃度	濃比値
15	1.0945	45	1.3360
20	1.1290	50	1.3875
25	1.1650	55	1.4475
30	1.2030	60	1.5050
35	1.2445	65	1.5725
40	1.2890	70	1.6575

[0037]

[Effect of the Invention]

This invention can reduce the APFC concentration in a PTFE aqueous dispersion-liquid constituent, and can offer a more desirable PTFE aqueous dispersion-liquid constituent.

[Translation done.]